PRA RULEBOOK: CRR FIRMS: INTEREST RATE RISK ARISING FROM NON TRADING ACTIVITIES INSTRUMENT 2020

Powers exercised

A. The Prudential Regulation Authority ("PRA") makes this instrument in the exercise of the following powers and related provisions in the Financial Services and Markets Act 2000 ("the Act"):

(1) section 137G (The PRA's general rules); and
(2) section 137T (General supplementary powers).

B. The rule-making powers referred to above are specified for the purpose of section 138G(2) (Rule-making instrument) of the Act.

Pre-conditions to making

C. In accordance with section 138J of the Act (Consultation by the PRA), the PRA consulted the Financial Conduct Authority. After consulting, the PRA published a draft of proposed rules and had regard to representations made.

PRA Rulebook: CRR Firms: Interest Rate Risk Arising from Non Trading Activities Instrument 2020

D. The PRA makes the rules in the Annex to this instrument.

Commencement

E. This instrument comes into force on 31 December 2021.

Citation

F. This instrument may be cited as the PRA Rulebook: CRR Firms: Interest Rate Risk Arising from Non Trading Activities Instrument 2020.

By order of the Prudential Regulation Committee
28 December 2020

Annex

Amendments to the Internal Capital Adequacy Assessment Part

In this Annex new text is underlined and deleted text is struck through.

Internal Capital Adequacy Assessment

1 Application and Definitions

…

1.2 In this Part the following definitions shall apply:

…

credit spread risk

means the risk driven by changes in the market perception about the price of *credit risk*, liquidity premium and potentially other components of credit-risky instruments inducing fluctuations in the price of *credit risk*, liquidity premium and other potential components, which is not explained by interest rate risk arising from non-trading book activities or by expected credit/(jump-to-) default risk.

EVE

means the economic value of equity of a *firm*.

option risk

means risk arising from option derivative positions or from optional elements embedded in a *firm's* assets, liabilities and off-balance sheet items, where the *firm* or its counterparty can alter the level and timing of their cash flows.

9 INTEREST RATE RISK ARISING FROM NON-TRADING BOOK ACTIVITIES

General requirements

9.1 A *firm* must implement systems to identify, evaluate and manage the risk arising from potential changes in interest rates that affect a *firm's* non-trading activities including the risks of such changes impacting either or both of the following:

(1) the economic value of the *firm's* non-trading activities;

(2) the earnings in respect of the *firm's* non-trading activities.

9.1A A *firm* must in addition implement systems to monitor and assess *credit spread risk* in respect of its non-trading activities.

9.1B As an alternative to implementing internal systems under 9.1(1), and only where appropriate to its nature, size and complexity as well as business activities and overall risk profile, a *firm* may elect to implement the standardised framework set out in 9.13 to 9.43 to identify, evaluate and manage the risk arising from potential changes in interest rates that affect the economic value of the *firm's* non-trading activities.

9.1C A *firm* shall notify the *PRA* prior to any implementation of the standardised framework pursuant to 9.1B or, if it elects to cease implementing the standardised framework, prior to doing so.

9.2 As part of its obligations under the overall Pillar 2 rule in 3.1, a *firm* must carry out an evaluation of its exposure to the interest rate risk arising from its non-trading activities, including an evaluation of its exposure to risk arising from potential changes in interest rates that affect either or both of the following:

(1) the economic value of the *firm's* non-trading activities;

(2) the earnings in respect of the *firm's* non-trading activities.

9.3 ~~The evaluation under 9.2 must cover the effect of a sudden and unexpected change in interest rates of 200 basis points in both directions.~~ [Deleted.]

9.4 ~~A *firm* must immediately notify the *PRA* if any evaluation under this *rule* suggests that, as a result of the change in interest rates described in 9.3, the economic value of the *firm* would decline by more than 20% of its *own funds*.~~ [Deleted.]

9.4A A *firm* must regularly carry out an evaluation in respect of the interest rate shock scenarios in 9.7 and immediately notify the *PRA* if any evaluation under this rule indicates that, as a result of the application of the interest rate scenarios in 9.7, the *EVE* would decline by more than 15% of the sum of its *common equity tier one capital* and its *additional tier one capital*.

9.5 A *firm* must carry out the evaluation under 9.2 as frequently as necessary for it to be reasonably satisfied that it has at all times a sufficient understanding of the degree to which it is exposed to the risks referred to in 9.2 and the nature of that exposure. In any case it must carry out those evaluations no less frequently than once a year.

9.6 A *firm's management body* must oversee and approve the *firm's* risk appetite and risk management framework for managing interest rate risk from non-trading book activities.

Interest rate shock scenarios

9.7 For the purposes of the evaluation in 9.4A, a *firm* must apply the following prescribed interest rate scenarios to all material currencies as determined in 9.8:

scenario 0: current interest rates;

scenario 1: parallel shock up;

scenario 2: parallel shock down;

scenario 3: steepener shock (short rates down and long rates up);

scenario 4: flattener shock (short rates up and long rates down);

scenario 5: short rates shock up; and

scenario 6: short rates shock down.

9.8 For the purposes of 9.7 and 9.15, a *firm* shall determine which currencies are material currencies using the following tests:

(1) each currency that has non-trading book assets in that currency more than 5% of total non-trading book assets shall be a material currency;

(2) where the sum of non-trading book assets in material currencies as identified under (1) does not exceed 90% of total non-trading book assets, a *firm* must select additional currencies to be deemed material currencies such that the sum of non-

trading book assets in material currencies as identified under (1) and (2) is at least 90% of total non-trading book assets;

(3) each currency that has non-trading book liabilities in that currency more than 5% of total non-trading book liabilities shall be a material currency; and

(4) where the sum of non-trading book liabilities in material currencies as identified under (3) does not exceed 90% of total non-trading book liabilities, a *firm* must select additional currencies to be deemed material currencies such that the sum of non-trading book liabilities in material currencies as identified under (3) and (4) is at least 90% of total non-trading book liabilities.

9.9 For the interest rate scenarios specified in 9.7, a *firm* shall determine the change to interest rates in accordance with the following formulae:

for scenario 0: $\Delta R_c(t_k) = 0$

for scenario 1: $\Delta R_c(t_k) = +\bar{R}_c^{parallel}$

for scenario 2: $\Delta R_c(t_k) = -\bar{R}_c^{parallel}$

for scenario 3: $\Delta R_c(t_k) = -0.65 \cdot \left|\Delta R_{short,c}(t_k)\right| + 0.9 \cdot \left|\Delta R_{long,c}(t_k)\right|$

for scenario 4: $\Delta R_c(t_k) = +0.8 \cdot \left|\Delta R_{short,c}(t_k)\right| - 0.6 \cdot \left|\Delta R_{long,c}(t_k)\right|$

for scenario 5: $\Delta R_c(t_k) = +\Delta R_{short,c}(t_k)$

for scenario 6: $\Delta R_c(t_k) = -\Delta R_{short,c}(t_k)$

Where:

c = the index that denotes currency;

k = the index that denotes the buckets in accordance with Table 2 in 9.17 below;

t_k = the bucket midpoint of bucket k, measured in years;

$\Delta R_c(t_k)$ = the change in interest rate at the point t_k for currency c;

$\bar{R}_c^{parallel}$= the prescribed parallel interest rate shock for currency c determined in accordance with column two of Table 1 in 9.11;

$\Delta R_{short,c}(t_k)$= the change in short interest rate at the point t_k for currency c determined in accordance with the formulae in 9.10; and

$\Delta R_{long,c}(t_k)$= the change in long interest rate at the point t_k for currency c determined in accordance with the formulae in 9.10.

9.10 For the purposes of 9.9, a *firm* shall determine the value of $\Delta R_{short}(t_k)$ and $\Delta R_{long}(t_k)$ in accordance with the following formulae:

(1) for $\Delta R_{short,c}(t_k)$: $\Delta R_{short,c}(t_k) = \pm \bar{R}_{short,c} \cdot e^{-\frac{t_k}{x}}$

(2) for $\Delta R_{long,c}(t_k)$: $\Delta R_{long,c}(t_k) = \pm \bar{R}_{long,c} \cdot \left(1 - e^{-\frac{t_k}{x}}\right)$

Where:

c = the index that denotes currency;

k = the index that denotes the buckets in accordance with Table 2 in 9.17 below;

e = the mathematical constant that is the base of the natural logarithm;

x = 4;

t_k = the bucket midpoint of bucket k, measured in years;

$\Delta R_{short,c}(t_k)$= the change in short interest rate at the point t_k for currency c;

$\Delta R_{long,c}(t_k)$= the change in long interest rate at the point t_k for currency c;

$\bar{R}_c^{short}$= the prescribed short interest rate shock for currency c determined in accordance with column three of Table 1 in 9.11; and

$\bar{R}_c^{long}$= the prescribed long interest rate shock for currency c determined in accordance with column four of Table 1 in 9.11.

9.11 For the purposes of 9.9, the interest rate shock scenarios for individual currencies are those in Table 1 below:

Table 1. Specified size of interest rate shocks for each currency (bps)

Currency	**Parallel**	**Short**	**Long**
ARS	400	500	300
AUD	300	450	200
BRL	400	500	300
CAD	200	300	150
CHF	100	150	100
CNY	250	300	150
EUR	200	250	100
GBP	250	300	150
HKD	200	250	100
IDR	400	500	350
INR	400	500	300
JPY	100	100	100
KRW	300	400	200
MXN	400	500	300
RUB	400	500	300
SAR	200	300	150
SEK	200	300	150

SGD	150	200	100
TRY	400	500	300
USD	200	300	150
ZAR	400	500	300

9.12 For material positions in currencies not listed in 9.11, a *firm* must use appropriate shocks for the scenarios listed in 9.7.

Standardised Framework

Calculating Loss in Economic Value

9.13 Using the standardised framework, a *firm* shall carry out the evaluation in 9.1(1) by calculating the loss in *EVE* (EVE_{loss}) in accordance with the following formula:

$$EVE_{loss} = \max_{i \in \{1,2,\ldots,6\}} \left\{ \sum_{c:\Delta EVE_{i,c}>0} \Delta EVE_{i,c} \right\}$$

Where:

i = the index that denotes the interest rate shock scenarios in accordance with 9.15;

c = the index that denotes the material currencies in accordance with 9.15; and

$\Delta EVE_{i,c}$ = the change in economic value in currency c for interest rate scenario i as calculated in accordance with 9.14.

9.14 For the purposes of 9.13, a *firm* must calculate the change in economic value in a given currency for a given interest rate scenario in accordance with the following formula:

$$\Delta EVE_{i,c} = NAO_{i,c} + KAO_{i,c}$$

Where:

i = the index that denotes the interest rate shock scenarios in accordance with 9.15;

c = the index that denotes the material currencies in accordance with 9.15;

$\Delta EVE_{i,c}$ = the change in economic value in currency c for interest rate scenario i;

$NAO_{i,c}$ = the non-automatic *option risk* in currency c for interest rate scenario i as calculated in accordance with 9.16; and

$KAO_{i,c}$ = the automatic *option risk* in currency c for interest rate scenario i as calculated in accordance with 9.41.

9.15 For the purposes of 9.13 and 9.14, a *firm* must calculate the change in economic value in a given currency for a given interest rate scenario, $\Delta EVE_{i,c}$, for every possible pair of:

(1) interest rate scenarios, i in 9.7; and

(2) each material currency, c as determined in 9.8.

9.16 For the purposes of 9.14, a *firm* must calculate the non-automatic *option risk* in currency c for interest rate scenario i ($NAO_{i,c}$) in accordance with the following formula:

$$NAO_{i,c} = \sum_{k=1}^{19} CF_{0,c}(k) \,.\, DF_{0,c}(t_k) - \sum_{k=1}^{19} CF_{i,c}(k) \,.\, DF_{i,c}(t_k)$$

Where:

i = the index that denotes the interest rate shock scenarios in accordance with 9.15;

c = the index that denotes the material currencies in accordance with 9.15;

k = the index that denotes the buckets in accordance with Table 2 in 9.17;

$DF_{i,c}(t_k)$ (respectively $DF_{0,c}(t_k)$) = the discount factor for bucket k in currency c for interest rate scenario i (respectively for interest rate scenario 0), calculated in accordance with 9.18; and

$CF_{i,c}(k)$ (respectively $CF_{0,c}(k)$) = the net repricing cash flow for bucket k in currency c for interest rate scenario i (respectively for interest rate scenario 0), calculated in accordance with 9.19 to 9.40.

9.17 For the calculation of discount factors and notional repricing cash flows in 9.18 and 9.19, a *firm* must project all notional repricing cashflows on to the following bucket intervals or bucket midpoints:

Table 2

Time bucket intervals and mid points (M = months, Y = years)			
	Bucket number (k)	Bucket interval	Bucket midpoint
Short-term rates	1	Overnight	0.0028Y
	2	> Overnight and <= 1M	0.0417Y
	3	> 1M and <= 3M	0.1667Y
	4	> 3M and <= 6M	0.375Y
	5	> 6M and <= 9M	0.625Y
	6	> 9M and <= 1Y	0.875Y
	7	> 1Y and <= 1.5Y	1.25Y
	8	> 1.5Y and <= 2 Y	1.75Y
Medium-term rates	9	>2 Y and <= 3Y	2.5Y
	10	> 3Y and <= 4Y	3.5Y
	11	> 4Y and <= 5Y	4.5Y
	12	> 5Y and <= 6Y	5.5Y
	13	> 6Y and <= 7Y	6.5Y
Long-term rates	14	> 7Y and <= 8Y	7.5Y
	15	> 8Y and <= 9Y	8.5Y
	16	>9 Y and <= 10Y	9.5Y
	17	> 10Y and <= 15Y	12.5Y
	18	> 15Y and <= 20Y	17.5Y
	19	> 20Y	25Y

9.18 (1) For the purposes of 9.16, a *firm* must calculate the discount factor for bucket k in currency c for interest rate scenario i ($DF_{i,c}(t_k)$) in accordance with the following formula:

$$DF_{i,c}(t_k) = e^{-R_{i,c}(t_k) \cdot t_k}$$

Where:

i = the index that denotes the interest rate shock scenarios in accordance with 9.15;

c = the index that denotes the material currencies in accordance with 9.15;

k = the index that denotes the buckets in accordance with Table 2 in 9.17;

e = the mathematical constant that is the base of the natural logarithm;

t_k = the bucket midpoint of bucket k in accordance with Table 2 in 9.17; and

$R_{i,c}(t_k)$= subject to (2), the risk-free zero coupon rate at bucket midpoint t_k in currency c for interest rate scenario i, including any commercial margin and other spread components.

(2) A *firm* may elect to use the risk-free zero coupon rate $R_{i,c}(t_k)$ excluding commercial margin and other spread components, provided the *firm* either (i) implements a prudent and transparent methodology for deducting commercial margins and other spread components from the initial repricing cash flows CF^{α} in 9.26 or (ii) determines that the effect of deducting commercial margins and other spread components is not material.

9.19 In accordance with 9.21, 9.22, 9.23 and 9.24, a *firm* must assign each interest rate risk position arising from non-trading activities to one of the following categories:

category 1: automatic interest rate options;
category 2: non-maturing deposits;
category 3: fixed rate loans with retail borrowers that are subject to prepayment risk;
category 4: term deposits by retail depositors subject to early redemption risk; and
category 5: other positions.

9.20 A *firm* must perform the allocation in 9.19 for all interest rate-sensitive non-trading book:

(1) assets, excluding assets that are:

(a) deducted from *common equity tier one capital*;
(b) fixed assets, including real estate and intangible assets; or
(c) equity exposures in the non-trading book;

(2) liabilities**,** including all non-remunerated deposits and excluding *common equity tier one capital*; and

(3) off-balance sheet items.

9.21 Under 9.19, term deposits that satisfy either of the following conditions may be treated as other positions in 9.19:

(1) the depositor has no legal right to withdraw the deposit; or

(2) an early withdrawal results in a significant penalty that at least compensates for the loss of interest between the date of withdrawal and the contractual maturity date and the economic cost of breaking the contract.

9.22 For the purposes of 9.19, and subject to 9.23, a *firm* must bifurcate any position with an embedded automatic interest rate option into two positions:

(1) a position excluding the embedded automatic interest rate option, which must be allocated to the other positions category in 9.19; and

(2) the embedded automatic interest rate option, which must be allocated to the category of automatic interest rate options in 9.19.

9.23 Where a *firm* is able to demonstrate that the embedded optionality is not material, the *firm* may choose not to perform the bifurcation in 9.22 and may directly allocate the position to the other positions category in 9.19.

9.24 For the purposes of 9.19, automatic interest rate options include:

(1) term deposits by wholesale depositors that do not meet the conditions in 9.21;

(2) wholesale fixed rate loans subject to prepayment risk; and

(3) mortgage loans with embedded caps and/or floors.

9.25 For each position allocated to the categories 2 to 5 in 9.19, a *firm* must determine a set of initial repricing cash flows, CF^{α}, per currency, in accordance with 9.26 and 9.27.

9.26 For each position, a *firm* must determine a set of initial repricing cash flows CF^{α} as:

(1) any repayment of principal;

(2) any repricing of principal; and

(3) any interest payment on a tranche of principal that has not yet been repaid or repriced.

9.27 A *firm* must determine the set of initial repricing cash flows CF^{α} for floating rate positions as:

(1) a series of coupon payments until the next repricing; and

(2) a par notional cash flow at the point of the next repricing.

9.28 In accordance with 9.32 to 9.40 for each material currency c identified in accordance with 9.15 and for interest rate scenario i, a *firm* must allocate each notional repricing cash flow $CF_{i,c}$ to one of the buckets in Table 2 in 9.17 based on the repricing date, where repricing date means the date of each repayment, repricing or interest payment.

9.29 A *firm* may first choose to split an initial repricing cash flow determined in 9.25, CF^{α}, into two cash flows with tenors equal to the two bucket mid-point tenors in column 4 of Table 2 in 9.17 that are adjacent to the tenor of the initial repricing cash flow CF^{α}.

9.30 Where a *firm* chooses to apply the methodology in 9.29, that *firm* must:

(1) split each initial repricing cash flow determined in 9.25, CF^{α} such that:

(a) the sum of the resulting two cash flows is equal to the initial repricing cash flow, CF^{α}; and

(b) the weighted average maturity of the resulting two cash flows equals the initial repricing cash flows' maturity; and

(2) document the methodology that the *firm* implements to split cash flows.

9.31 For 9.16, the net repricing cash flow for bucket k in currency c for interest rate scenario i, ($CF_{i,c}(k)$) shall be determined as the sum of $CF_{i,c}$ as determined in 9.28 which:

(1) are derived from initial repricing cash flows CF^{α} that are allocated to currency c for interest rate scenario i in accordance with 9.28; and

(2) allocated to bucket k in accordance with Table 2 in 9.17.

Non-maturing deposits

9.32 For non-maturing deposits as determined in 9.19, a *firm* must allocate each position into one of the following categories:

(1) retail deposits defined as deposits placed with a *firm* by a natural *person* and where either regular transactions are carried out or the deposits are non-interest bearing;

(2) any other deposits with a *firm* by a natural *person* which are not covered in (1); or

(3) other deposits.

9.33 For the purposes of 9.32(1) deposits made by small businesses, legal entities, sole proprietorships or *partnerships* managed as retail exposures provided the total aggregated liabilities are less than £877,000 may also be treated as retail deposits.

9.34 For each category in 9.32, a *firm* must allocate each position to the following categories:

(1) the core portion, consisting of deposits that are found to remain undrawn with a high degree of likelihood using data history of an appropriate length, and unlikely to reprice even under significant changes in the interest rate environment; and

(2) the non-core portion, consisting of deposits not allocated to the core portion.

9.35 For non-maturing deposits as determined in 9.34, the notional repricing cash flows in currency c for each interest rate scenario i, $CF_{i,c}$, must be:

(1) for the core portion, the initial notional repricing cash flows $CF_{i,c}^{\alpha}$ in currency c for interest rate scenario i with the *firm*'s own estimates of tenors; and

(2) for the non-core portion, the initial notional repricing cash flows $CF_{i,c}^{\alpha}$ in currency c for interest rate scenario i with an overnight tenor.

9.36 For the allocation in 9.34 and the calculation of CF_i in 9.35, a *firm* must ensure that the proportion and average repricing date of core deposits is no greater than the caps in Table 3:

Table 3: Caps on core deposits

	Cap on proportion of core deposits (%)	Cap on average repricing date of core deposits (years)
Transactional retail deposits (as referred to in 9.32(1))	90	5
Other retail deposits (as referred to in 9.32(2))	70	4.5
Other deposits (as referred to in 9.32(3))	50	4

Fixed Rate Loans

9.37 For fixed rate loans with borrowers that are subject to prepayment risk as determined in 9.19, a *firm* must:

(1) allocate each position to a single portfolio of homogeneous positions p denominated in a single currency c;

(2) for each portfolio of homogeneous positions, determine and notify the *PRA* a baseline monthly conditional prepayment rate ($CPR^{p}_{0,c}$) in currency c under the current term structure of interest rates;

(3) for each portfolio of homogeneous positions, determine the conditional prepayment rate in currency c for interest rate scenario i, ($CPR_{i,c}$) in accordance with the following formula:

$$CPR^{p}_{i,c} = \min(1, \gamma_i . CPR_{0,c})$$

where γ_i refers to the prescribed scalar multiplier for each interest rate shock scenarios given in Table 4 below.

Table 4

Scenario number i	Interest rate shock scenarios	γ_i (scenario multiplier)
0	Current interest rates	1
1	Parallel up	0.8
2	Parallel down	1.2
3	Steepener	0.8
4	Flattener	1.2
5	Short rate up	0.8
6	Short rate down	1.2

(4) for each portfolio of homogeneous positions, determine the notional repricing cash flows $CF_{i,c}$ allocated to bucket 1 in accordance with Table 2 in 9.17, $CF_{i,c}(1)$, in accordance with the following formula:

$$CF_{i,c}(1) = CF^{\alpha}_{i,c}(1) + 0.05 \cdot CPR_{i,c} \cdot N_i(0)$$

Where:

$CF^{\alpha}_{i,c}(1)$ = the initial repricing cash flows CF^{α} for interest rate scenario i with tenor that corresponds to bucket 1 in accordance with Table 2 in 9.17; and

$N_i(0)$ = the notional currently outstanding before any repayments.

(5) for each portfolio of homogeneous positions, determine the notional repricing cash flows $CF_{i,c}$ allocated to each bucket k in Table 2 where $k > 1$, $CF_{i,c}(k)$, in accordance with the following recursive formula:

$$CF_{i,c}(k) = \min\left(\begin{matrix} CF^{\alpha}_{i,c}(k) + \min(1, W(k) \cdot CPR_{i,c}) \cdot N_i(k-1); \\ \sum_{k=1}^{19} CF^{\alpha}_{i,c}(k) - \sum_{q=1}^{k-1} CF_{i,c}(q) \end{matrix}\right)$$

Where:

k = the index that denotes the buckets in accordance with Table 2 in 9.17;

$W(k)$= the width of bucket k measured in months and capped at 1200;

$CF_{i,c}^{\alpha}(k)$ = the initial repricing cash flows CF^{α} in currency c for interest rate scenario i with tenor that corresponds to bucket k;

$N(k-1)$ = the notional outstanding after notional repricing cash flows in bucket $k-1$ have transpired; and

$\sum_{q=1}^{k-1} CF_{i,c}(q)$ = the sum of CF_i determined for preceding buckets 1 to $k-1$.

9.38 For the purpose of 9.37, *firms* may adjust the formulas in 9.37 (4) and (5) to reflect a base monthly conditional prepayment rate $CPR_{0,c}^{p}(k)$ that varies over the life of each loan in the portfolio. In that case, it is denoted as for each time bucket *k* or time bucket midpoint *tk* in accordance with Table 2 in 9.17.

Term Deposits Subject to Early Redemption Risk

9.39 For term deposits by depositors subject to early redemption risk as determined in 9.19, a *firm* must:

(1) allocate each position to a single portfolio of homogeneous positions p denominated in each material currency c;

(2) for each portfolio of homogeneous positions, determine and notify the *PRA* a baseline term deposit redemption ratio ($TDRR_{o,c}^{p}$) in currency c under the current term structure of interest rates;

(3) for each portfolio of homogeneous loans, determine the conditional term deposit redemption ratio in currency c for interest rate scenario i, ($TDRR_{i,c}^{p}$) in accordance with the following formula:

$$TDRR_{i,c}^{p} = \min\left(1, u_i . TDRR_{i,c}^{p}\right)$$

where u_i refers to the prescribed scalar multiplier for each interest rate shock scenarios given in Table 5 below.

Table 5.

Scenario number (i)	Interest rate shock scenarios	u_i (scenario multiplier
0	Current interest rates	1
1	Parallel up	1.2
2	Parallel down	0.8
3	Steepener	0.8
4	Flattener	1.2
5	Short rate up	1.2
6	Short rate down	0.8

(4) for each portfolio of homogeneous positions, determine the notional repricing cash flows $CF_{i,c}$ allocated to bucket 1 in Table 2 in 9.17, $CF_{i,c}(1)$, in accordance with the following formula:

$$CF_{i,c}(1) = CF_{i,c}^{\alpha}(1) + TDRR_{i,c}^{p} \cdot TD_c$$

Where:

$CF_i^{\alpha}(1)$ = the initial repricing cash flows CF^{α} in currency c for interest rate scenario i with tenor that corresponds to bucket 1 in accordance with Table 2 in 9.17; and

TD_c = the total term deposits subject to early redemption for currency c.

(5) for each portfolio of homogeneous positions, determine the notional repricing cash flows CF_i allocated to bucket k in Table 2 other than bucket 1, $CF_i(k)$, in accordance with the following formula:

$$CF_{i,c}(k) = CF_{i,c}^{\alpha}(k) \cdot (1 - TDRR_{i,c}^{p})$$

Where:

k = the index that denotes the buckets in accordance with Table 2 in 9.17; and

$CF_{i,c}^{\alpha}(k)$ = the initial repricing cash flows CF^{α} in currency c for interest rate scenario i with tenor that corresponds to bucket k.

Other positions

9.40 For other positions as determined in 9.19, a *firm* must determine the notional repricing cash flows $CF_{i,c}$ allocated to bucket k in Table 2 other than bucket 1, $CF_i(k)$, in accordance with the following formula:

$$CF_{i,c}(k) = CF_{i,c}^{\alpha}(k)$$

Where:

k = the index that denotes the buckets in accordance with Table 2 in 9.17; and

$CF_{i,c}^{\alpha}(k)$ = the initial repricing cash flows $CF_{i,c}^{\alpha}$ in currency c for interest rate scenario i with tenor that corresponds to bucket k.

Automatic interest rate options

9.41 For 9.14, and subject to 9.42, a *firm* must determine the automatic *option risk* in currency c for interest rate scenario i ($KAO_{i,c}$) for all automatic interest rate options as determined in 9.19 and 9.22 in accordance with the following formula:

$$KAO_{i,c} = \sum_{p=1}^{n_c} \Delta FVAO_{i,c}^{p} - \sum_{q=1}^{m_c} \Delta FVAO_{i,c}^{q}$$

Where:

n_c = the index that denotes the number of all sold automatic options in currency c;

m_c = the index that denotes the number of all bought automatic options in currency c;

$\Delta FVAO_{i,c}^{p}$ = the change in value of sold automatic option p for interest rate scenario i, calculated in accordance with 9.43; and

$\Delta FVAO_{i,c}^{q}$ = the change in value of bought automatic option q for interest rate scenario i, calculated in accordance with 9.43.

9.42 A *firm* may choose to include in the calculation of $\sum_{q=1}^{m_c} \Delta FVAO_{i,c}^{q}$ only bought automatic options that are used for hedging sold automatic interest rate options, provided that the *firm* must add to $KAO_{i,c}$ in 9.41 the value of bought automatic options that are not for hedging sold automatic interest rate options that is included in *the firm's o*wn funds.

9.43 (1) For 9.41, a *firm* must calculate the change in value of sold automatic option p (respectively bought automatic option q) for interest rate scenario i other than interest rate scenario 0, $\Delta FVAO_{i,c}^{p}$ (respectively $\Delta FVAO_{i,c}^{q}$), as the increase in value of the option to the option holder:

(a) from the value of the option for interest rate scenario 0; and

(b) to the value of the option for interest rate shock scenario i with a relative increase in implied volatility of 25%.

(2) For 9.41, a *firm* must set the change in value of sold automatic option p (respectively bought automatic option q) for interest rate scenario 0, $\Delta FVAO_{0,c}^{p}$ (respectively $\Delta FVAO_{0,c}^{q}$), as 0.

(3) A *firm* must notify the *PRA* of the methodology used to estimate the value of automatic options in (1).